A. Title: Application for a Permit for Scientific Purposes under Section 10 of the Endangered Species Act.

B. Species (Evolutionarily Significant Units)

Puget Sound Chinook Salmon (threatened)
Puget Sound Steelhead (threatened)
Columbia River chum salmon (threatened)
Upper Columbia River (UCR) Chinook Salmon (endangered)
Upper Columbia River (UCR) Steelhead (endangered)
Lower Columbia River (LCR) Chinook Salmon (threatened)
Lower Columbia River (LCR) Steelhead (threatened)
Lower Columbia River (LCR) Coho Salmon (threatened)
Middle Columbia River (MCR) Steelhead (threatened)
Upper Willamette River (UWR) Chinook Salmon (threatened)
Upper Willamette River (UWR) Steelhead (threatened)
Snake River Spring & Fall Chinook Salmon (endangered)
Snake River Steelhead (threatened)
Oregon Coast (OC) Coho Salmon (uncertain)

C. Application Date: 6 June 2008

D. Applicant Identity:

Robert M. Hughes
Department of Fisheries & Wildlife
Oregon State University
200 SW 35th Street
Corvallis, OR 97333
Phone: 541 754 4516
Fax: 541 754 4716
Email: hughesb@mail.cor.epa.gov

E. Information on Personnel, Cooperators, and Sponsors

1. Principal Investigator: Robert M. Hughes

Robert M. Hughes received his Ph.D. in Fisheries from Oregon State University in 1979, and is a Senior Research Professor in the Department of Fisheries & Wildlife at Oregon State University and a member of Oregon's Independent Multidisciplinary Science Team. He has sampled fish in streams (California, Colorado, Idaho, Michigan, Montana, Nevada, Oregon, Washington, Brazil, Portugal) and rivers (Arizona, Ohio, Oregon, Pennsylvania, France, Brazil) with backpack, barge, and boat electrofishers. Dr. Hughes took an electrofishing course from the U.S. Fish & Wildlife Service Fisheries Academy in 1991 and a second course sponsored by the USEPA in 1997. He is a chapter author in New Perspectives in Electrofishing (Hughes 1999) coauthor of an electrofishing chapter in three USEPA biomonitoring protocols (Plafkin et al. 1989; McCormick & Hughes 2006; Hughes & McCormick In Press), and coauthor of a river fish sampling chapter in an AFS standard sampling book (Curry et al. In Press). Hughes has authored or coauthored 99 peer

reviewed publications dealing with fish assemblage monitoring and assessment, and has given invited seminars on those topics in France, Poland, Brazil, Bolivia, Portugal and Austria. He is Past-President of the Western Division of the American Fisheries Society, and received the 2006 Environmental Stewardship Award from the North American Benthological Society. Dr. Hughes has published on electrofishing sampling effort (Cao et al. 2001; 2002; Hughes & Herlihy 2007; Hughes et al. 2002; Reynolds et al. 2003), fish assemblage bioassessment (Hughes & Gammon 1987; Hughes et al. 1998; Mebane et al. 2003; Peterson et al. 2007; Rinne et al. 2005; Spence et al. 1996), and alien fish species in the western USA (Hughes 1981; LaVigne et al. 2008; In Press; Lomnicky et al. 2007).

Field Supervisor: Jason D. Adams

Jason D. Adams received his B.Sc. in Fisheries from Oregon State University in 2003 and has over 1600 hours of boat and backpack electrofishing experience. That experience collecting fish and obtaining, complying with, and reporting on fish collection permits includes the following:

- June 2007--Present, Oregon State University, Crew Chief & Fish Taxonomist, sampled fish assemblages at 20 sites each in the Chehalis, Sprague, and Umpqua Rivers;
- October 2004--October 2006, Ducks Unlimited, Consultant, collected salmonids from a Columbia River wetlands rehabilitation project;
- August—October 2004, Ecosystems Northwest, Consultant, surveyed fish and amphibian assemblages in the Siuslaw and Willamette National Forests;
- October 2000—June 2004, Oregon State University, Crew Chief, monitored juvenile Chinook salmon populations in Willamette River artificial alcoves during the wet season;
- June 2003—June 2004, Oregon State University, Research Assistant, monitored Lahontan cutthroat trout populations in high desert streams of Oregon and Idaho;
- May 2002—October 2002, Dynamac Corporation, Fish Taxonomist, surveyed river fish assemblages across 12 conterminous western USA states.

2. Field personnel: These individuals will be hired before the field season starts.

3. Funding sources: U.S. Environmental Protection Agency, U.S. Fish & Wildlife Service, National Marine Fisheries Service, Natural Resources Conservation Service.

SPONSORS & COOPERATING INSTITUTIONS:

Aaron Borisenko, ODEQ, 1712 SW 11th, Portland, OR, 97201, 503 229 5983.
Mike Mulvey, ODEQ, 1712 SW 11th, Portland, OR, 97201, 503 229 5983.
Doug Drake, ODEQ, 1712 SW 11th, Portland, OR, 97201, 503 229 5983.
Mario Solazzi, ODFW, 28655 Hwy. 34, Corvallis, OR, 97333, 541 757 4263
Glenn Merritt, WA Ecology, 300 Desmond Dr., Olympia, WA, 98504, 360 407 6777
Gretchen Hayslip, USEPA, 1200 Sixth Ave., Seattle, WA, 98101, 206 553 1685
Lil Herger, USEPA, 1200 Sixth Ave., Seattle, WA, 98101, 206 553 1074
Peter Leinenback, USEPA, 1200 Sixth Ave., Seattle, WA, 98101, 206 553 0524
Brian Hill, USEPA, 6201 Congdon Blvd., Duluth, MN, 55804, 218 529 5224
David Peck, USEPA, 200 SW 35th St., Corvallis, OR, 97333, 541 754 4426
John Stoddard, USEPA, 200 SW 35th St., Corvallis, OR, 97333, 541 754 4441

Steve Corbett, USNPS, 600 E. Park Ave., Port Angeles, WA, 98362, 360 565 3086
John Arterburn, Colville Confed.Tribes, 23 Brooks Tracts Rd., Omak, WA, 98841, 509 422 7424
Kathryn Boyer, NRCS, Suite 1000, 1201 NE Lloyd Blvd., Portland, OR 97232, 503 273 2412
Mark Buettner, USFWS, 1936 California Ave., Klamath Falls, OR 97601, 541 885 8481
Chris Jordan, NMFS, 200 SW 35th St., Corvallis, OR 97333, 541 754 4629
Sam Chan, OSU Aquatic Invasive Species Specialist, Corvallis, OR 97331, 503 679 4828

4. Statement of cooperator: Robert Hughes will be in contact with and supervise the taking of fish by the Oregon State University field crew. Jason Adams will have day-to-day oversight responsibility.

5. Specimen Disposition: Vouchers of non-listed fish species collected, or the occasional species that are killed, will be deposited in museum(s) and laboratories.

Voucher fish specimens from the field season will be deposited with:

Dr. Douglas F. Markle
Curator of Fishes
Oregon State University Ichthyological Museum
Department of Fisheries & Wildlife
Oregon State University
Corvallis, OR 97331
541 737 1970

6. Transporting & Holding: There will be no transporting or holding of fish in this project.

F. Project Description, Purpose, and Significance

GENERAL: Our objective is to determine the minimum number of samples to estimate the condition of an entire main stem river in a rigorous manner. To do so we will obtain 20 random samples from two rivers in each of Oregon, Washington, and Idaho. Fish assemblages will be sampled by raft electrofishing. Assemblage data will be converted to index of biotic integrity (IBI) scores and analyzed through use of similarity analyses to determine the minimum number of sites need to attain $\pm$90% of the final IBI score produced from all 20.

OVERVIEW: The USEPA, USFWS, NMFS, and the Oregon and Washington water quality agencies are seeking scientifically and statistically rigorous field protocols for assessing large (unwadeable) rivers. They realize that a single sample is inadequate, and that a complete census is impractical. They also realize that hand-picked sites can produce biased estimates of entire rivers and cannot be used for inferring to other river reaches. Our river survey is a continuation of the USEPA's Environmental Monitoring and Assessment Program's (EMAP) sampling efforts in the same states during 2000-2004. Four persons in two rafts will sample fish, macroinvertebrates, and periphyton assemblages as well as physical and chemical habitat conditions in reaches 50 times the mean wetted width of the channel. 1-2 sites can be sampled per day. Since the river sites will all be randomly selected, the data collected can be used for estimating the ecological condition of each river.

BROADER SIGNIFICANCE: These sites are a continuation of a larger project that assessed the condition of rivers and streams in the 12 conterminous western states and found that 44% of the stream/river length was in least-disturbed condition for vertebrates, and 50% for invertebrates (Stoddard et al. 2005). That survey also found that 0-23.5% and 0-40.8% of the stream length or stream width, respectively, in some states were not assessed because of permit restrictions (Whittier et al. In Press). An objective of those surveys was to assess status and trends in a region's or state's surface waters in a statistically and ecologically rigorous manner as mandated by the Clean Water Act. Ecologically and statistically rigorous monitoring should lead to rigorous enforcement of that Act. This in turn will reduce the need for listing those aquatic species that are limited by physical and chemical habitat, and increase the recovery potential of those that are listed.

G. Project Methodology

PROCEDURES: Each river will be sampled once at 20 randomly-selected sites between 19 June and 15 September in 2009. Flows, fires, and work load determine which year each river is sampled. Rivers are fished using a Smith-Root 2.5 GPP electrofisher (pulsed DC current) mounted on the rowing frame of a 14' or15' raft. Single pass electrofishing is employed and block nets are not used. Stunned fish are recovered in a soft mesh dipnet and placed in a livewell. Rivers are fished by randomly selecting one side of the river to begin electrofishing and rowing downstream a distance equal to 50 times the mean wetted channel width. We alternate sides of the river every other transect, stopping every 5 channel widths to process the fish. We remove each fish from the livewell, record species, the minimum and maximum length, and presence of any anomalies, then return the fish to the water alive. Holding times in the livewell following these procedures have ranged from 6-17 minutes and varied with current velocity and the number of fish netted. Any suspected listed fish are not netted or, if collected, processed first to minimize stress in these animals. We follow the general guidelines for fish field research of Hubbs et al. (1988). Where allowed, voucher specimens for taxonomic verification are labeled and preserved in 10% formalin.

INJURY POTENTIAL: The potential for injury or mortality to listed species exists with electrofishing. Trauma may include bruising if the fish directly contacts the electrofisher anode droppers, and exhaustion resulting from electrofishing and handling. Occasional incidental mortality may occur as well resulting from a combination of these stresses.

To reduce mortalities at sampling sites, we hire experienced crew members, train them for two weeks, and audit their field work. We do not hold fish in the electrical field and we exchange live well water after each subsample. We handle fish for just a few seconds to determine the species and to measure total length, if necessary, for minimum and maximum sized fish.

We attempt to minimize our impact on fish through a variety of mechanisms including avoidance of targeted fish through sample timing, consulting with local and state scientists so that we generally know what species and sizes of fish to expect, not using chemicals to sedate fish, minimal holding time in live wells, and minimization of shocking impacts.

Consultation with district and regional biologists helps identify the presence of listed fish prior to

any electrofishing, and helps determine a sampling period to minimize the likelihood of encountering spawning adults or smolting juveniles. We cease electrofishing if any listed adults enter the electrical field.

To further minimize potential injury due to electrofishing, we use a low pulse rate (30 pulses/s), a narrow pulse width (< 6 msec), and low peak voltage (500 V). These settings are much less damaging to adult fish, and although not as effective for collecting small fish, they do stimulate benthic species to move up into the water column where they are more easily netted. In addition, we employ large cathodes (20 droppers) along the sides of the raft and 6 anode droppers at the front to reduce the field strength in the vicinity of an individual electrode. This also allows us to use lower voltages. When we see that juveniles are being harmed and no adults are being collected, we increase the pulse rate (which decreases damage to small fish, but increases the threat to larger fish), and shorten the holding time in the live well.

To reduce the risk of disease transfer (e.g., whirling disease), all equipment used while electrofishing is chemically disinfected with an ammonium derivative (Betco®) between basins. To reduce the transport of alien invasive species the rafts and travels are powered washed in a commercial car wash facility between basins.

JUSTIFICATION FOR TAKING THREATENED OR ENDANGERED SPECIES: While collecting fish, benthos, and periphyton, listed species may also occasionally be encountered incidentally. For example, in an earlier survey we discovered a previously unknown population of Oregon chub (Hughes et al. 1998). In 1997 and 2007, we found two sucker populations that appear to represent distinct but currently unrecognized species. We have also documented the spread of alien invasive species and the loss of native species (Hughes 1981; LaVigne et al. 2008; In Press; Lomnicky et al. 2007) as well as the degraded state of fish assemblages in several river reaches (Hughes & Gammon 1987; Meador et al. 2008; Mebane et al.; Peterson et al. 2007; Whittier et al. 2007). In other words, our survey is not focused on listed species and few of our selected sites are expected to contain them, but occasionally we may take them, and under the terms of the Endangered Species Act we need permission to do so. We have selected a fish sampling method (raft electrofishing) that can be employed safely, economically, and efficiently from a human perspective. It is also the most effective technique for sampling the entire fish assemblage and involves far less handling stress than other nondestructive methods (trap nets, seines). Although snorkeling is suitable for identifying the presence of many water column species, it is ineffective for detecting benthic species or for distinguishing among species that often require laboratory identification (sculpins, lampreys). In addition, snorkeling in several rivers that we have selected would mean placing the snorkler at great risk to disease or drowning. Some sites are listed as whitewater rivers, where swimming in fast currents with obstacles is dangerous. Some rivers selected support bacteria concentrations that exceeded state standards for swimming, or are too turbid for detecting fish through snorkeling. Finally, using one method in most rivers and a second method in the others prevents us from making statistically valid estimates of riverwide condition in multiple rivers, which is necessary to achieve the objective of our study.

Benefits of this Project to the Wild Populations of Concern:

The objective of our biological sampling is to determine the species present and their proportionate abundances; these data are then used to estimate the biological condition of the rivers. Since the

sites were all randomly selected, the data collected over the two years of the project can then be used for making riverwide estimates of condition. Such information is essential for rational management of aquatic resources, whether they be listed species or simply ecosystems of concern. A long-term goal of this research is to aid subsequent assessments of status and trends in the nation's (region's) rivers in a statistically and ecologically rigorous manner as mandated by the Clean Water Act. Ecologically and statistically rigorous monitoring should lead to rigorous enforcement of that Act. This in turn will reduce the need for listing those aquatic species that are limited by physical and chemical habitat, and increase the recovery potential of those that are listed.

H. Description and Estimates of Take

1. List of each species and/or population and/or ESU to be taken: Our survey is not focused on listed species, but occasionally we may take them and under the terms of the Endangered Species Act we seek permission to do so. The list of threatened and/or endangered anadromous species (ESUs) that may be taken during sampling activities in 2009includes the following:

UCR Spring Chinook Salmon (*Oncorhynchus tshawytscha)*
UCR Steelhead (*Oncorhynchus mykiss*)
MCR Steelhead (*Oncorhynchus mykiss*)
Lower Columbia River (LCR) Chinook Salmon (*Oncorhynchus tshawytscha*)
Lower Columbia River (LCR) Steelhead (*Oncorhynchus mykiss*)
Lower Columbia River (LCR) Coho Salmon (*Oncorhynchus kisutch*)
Columbia River Chum Salmon (*Oncorhynchus keta*)
UWR Chinook Salmon (*Oncorhynchus tshawytscha)*
UWR Steelhead (*Oncorhynchus mykiss*)
OC Coho Salmon (*Oncorhynchus kisutch*)
Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)
Puget Sound Steelhead (*Oncorhynchus mykiss*)
Snake River Spring & Fall Chinook Salmon (*Oncorhynchus tshawytscha*)
Snake River Steelhead (*Oncorhynchus mykiss*)

All other anadromous listed species have ESU boundary ranges not overlapping with our target sites. Other listed resident species with overlapping ranges will be covered under a USFWS permit.

2. Sampling schedule and locations: Our surveys of these waters will occur between 19 June and 15 September based on district biologist recommendations to minimize and avoid potential impacts to listed species. The list of candidate rivers for 2009 will be sampled via raft electrofishing by Oregon State University (Table 1).

Table 1. Sampling locations within ESU boundaries in Washington and Oregon for 2009.

State	River Name	County	Gazeteer Pages	Upper	Lower
WA	Okanogan	Okanogan	100, 101, 115	Oroville	Monse
		Clallam	75	Soleduck Hot	Quillayute Rv.

State	River Name	County	Gazeteer Pages	Upper	Lower
	Soleduck			Springs	
	Skagit	Whatcom, Skagit	95, 96, 97, 109, 111	Newhalem	Skagit City
	Cowlitz	Cowlitz, Lewis,	32, 33, 46, 47, 48	Grand Purcell Falls	Columbia River
	Chehalis	Grays Harbor, Lewis	44, 45	Pe Ell	S. Montesano
OR	*Mary's	Benton	53	Avery Park	Willamette Rv.
	*Willamette	Lane- Multnomah	47, 53, 59, 60, 66	Eugene	Columbia Rv
	Umpqua	Douglas	35, 40	Roseburg	Scottsburg
	Malheur	Malheur	78, 79	Beulah Reservoir	Vale
	John Day	Wheeler, Gilliam	81, 80, 84	Kimberly	Cottonwood
	Grande Ronde	Union, Wallowa, Asotin (WA)	86, 87, 43 (WA)	LaGrande	Snake River
	Sandy	Clackamas, Multnoma	61, 67	Sandy	Columbia River

*****These training sites will be sampled in May-June 2009.

3 and 4. Description of recent status and trends relative to the locations of taking for each species/population/ESU to be taken:

Given the nature of our sampling, the age, size, sex, and origin (hatchery/wild) of the fish that might be incidentally taken are unknown. Given the anticipated sampling periods, it is highly unlikely that adult coho, chinook, or steelhead will be collected. Based on conversations with local fish biologists which are encapsulated below, we have attempted to identify a sampling period to either miss or minimally encounter listed salmonids.

WASHINGTON

Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha)* ESU.
Skagit River – To be determined.

Puget Sound steelhead (*Oncorhynchus mykiss*) ESU.
Skagit River – To be determined.

Upper Columbia River Spring Chinook Salmon (*Oncorhynchus tshawytscha)* ESU.
Okanogan River - John Arterburn (Colville Tribe anadromous fish biologist) feels we are unlikely to encounter chinook in the main stem because of warm summer temperatures, but anything is possible. We may incidentally take (catch and release) 5 chinook juveniles, and incidentally take (observe/harass) 2 chinook adults per site.

Upper Columbia River steelhead (*Oncorhynchus mykiss*) ESU.
Okanogan River - John Arterburn (Colville Tribe anadromous fish biologist) feels we are unlikely to encounter steelhead in the main stem because of warm summer temperatures, but anything is possible. We may incidentally take (catch and release) 5 steelhead juveniles, and incidentally take (observe/harass) 2 steelhead adults per site.

Lower Columbia River Chinook Salmon (*Oncorhynchus tshawytscha)* ESU.
Cowlitz River – To be determined.

Upper Columbia River steelhead (*Oncorhynchus mykiss*) ESU.
Cowlitz River – To be determined.

Lower Columbia River Coho Salmon (*Oncorhynchus kisutch)* ESU.
Cowlitz River – To be determined.

Columbia River Chum Salmon (*Oncorhynchus keta)* ESU.
Cowlitz River – To be determined.

OREGON

Snake River steelhead (*Oncorhynchus mykiss*) ESU.
Grand Ronde River—To be determined.

Snake River Spring & Fall Chinook salmon (*Oncorhynchus tshawytscha*) ESU.
Grand Ronde River—To be determined.

Columbia River Chum Salmon (*Oncorhynchus keta)* ESU.
Sandy River – To be determined.

Mid-Columbia steelhead (*Oncorhynchus mykiss*) ESU.
*John Day (Kimberly to Cottonwood): Tim Unterwegner (Oregon DFW district biologist) indicated that by sampling June through July we would avoid steelhead and still have enough water to float the river. We may incidentally take 5 juveniles (catch and release) and 2 adults (observe/harass) per site.

Upper Willamette River Chinook salmon (*Oncorhynchus tshawytscha*) wild & hatchery ESU.
Basins:
Jeff Ziller, Kelly Reis, and Steve Mamoyac (Oregon DFW district biologists) feel that by sampling the main stem Willamette between 15 July and 30 August we will minimize impact to listed salmon. The training rivers (lower Marys, Long Tom, Calapooia, M.F. Willamette, and

Willamette at Corvallis) usually lack salmon by late June.

* Marys River (River km 0-7): We may incidentally take 5 chinook juveniles (catch and release) and 2 adults (observe/harass).

* Willamette River (Eugene to Columbia): We may incidentally take 5 chinook juveniles (catch and release) and 2 adults per site (observe/harass).

Upper Willamette River steelhead (*Oncorhynchus mykiss*) ESU.
Jeff Ziller, Kelly Reis, and Steve Mamoyac (Oregon DFW district biologists) feel that by sampling the main stem Willamette between 15 July and 30 August we will minimize impact to listed steelhead.. The training rivers (lower Marys, Long Tom, Calapooia, M.F. Willamette, and Willamette at Corvallis) usually lack steelhead by late June.

* Willamette River (Eugene to Columbia): We may incidentally take 5 juveniles (catch and release) and 2 adults (observe/harass) per site.

Oregon Coast coho salmon (*Oncorhynchus kisutch*) ESU.
* Umpqua River: Sam Moyers (ODFW district biologist) suggests sampling June to September will avoid most salmon because the lower river is warm, but to be alert near tributaries. We may take (catch and release) 10 coho juveniles and possibly 2 coho adults (observe, harass) per site.

5. Estimates of potential annual mortalities by take category, including a justification: Refer to Table 3, 4 and 5 for take accounts of ESA listed fish in Washington and Oregon collected during EMAP sampling activities from 2000-03 (originally submitted as part of the annual report requirements). The indirect mortalities listed in Table 3-5 were a result of sampling activities (e.g., electrofishing, handling, generalized stress).

6. Provide details on how all take estimates, including mortalities, were derived: All take estimates are from direct measurements.

I. Transportation and Holding

No live fishes will be transported. It is probable that some live invertebrates will be transported incidentally on the rafts or vehicles, but these will be treated between basins.

J. Cooperative Breeding Program

We lack the facilities and interest to cooperate in a breeding program. We doubt that our data would contribute to a breeding program, but we can willingly provide it if it does.

K. Previous or Concurrent Activities Involving Listed Species

1. Identify all previous permits working with federally-listed species:

Federal permits held currently:

USFWS – Region 1: Recovery Permit No. TE-141832-0 for threatened bull trout (*Salvelinus confluentus*), threatened Lost River sucker (Deltistes luxatus), and threatened shortnose sucker (Chasmistes brevirostris). Expires 5/15/2011.

NMFS - NW Region permit for Scientific Purposes under Section 10 of the Endangered Species Act. Permit 1559. Species included: Upper Columbia Chinook salmon *(Oncorhynchus tshawytscha)*, Upper Columbia River steelhead (*Oncorhynchus mykiss)*, Middle Columbia River steelhead (*O. mykiss)*, Upper Willamette River steelhead *(O. mykiss),* Upper Willamette River Chinook salmon *(O. tshawytscha)*. Expires 12/31/08.

NMFS - SW Region permit (California) for Scientific Purposes under Section 10 of the Endangered Species Act. Permit number 1288. Species included: Southern Oregon/Northern California Coasts coho salmon (*Oncorhynchus kisutch*), Central California Coast coho salmon (*O. kisutch*), Northern California steelhead *(Oncorhynchus mykiss)*, Central California Coast steelhead (*O. mykiss)*, and California Coastal chinook salmon *(O. tschawytscha).* Expires 6/30/08.

Additional federal permits required:

None.

State permits held currently:

State of Oregon Scientific Taking Permit No. OR2008-4575P

Additional State permits required that have been applied for, or are in the process of application:

State of California
State of New Mexico
State of Arizona

List of previously held permits (federal, state, tribal):

USFWS - Region 1: Recovery Permit No. TE-025733-2 for threatened bull trout (*Salvelinus confluentus*), threatened Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*), and non-listed coastal cutthroat trout (*Oncorhynchus clarki clarki*). Permit No. TE-025733-0 was amended in 2001 (Permit No. TE025733-1) to include take of bull trout (*Salvelinus confluentus*) in additional sample sites in Oregon, Washington, and Idaho. Permit No. TE-025733-1 was amended in 2002 (Permit No. TE025733-2) to include Oregon chub (Oregonichthys crameri) and White River spinedace (Lepidomeda albivallis). Expired 7/10/05.

USFWS - Region 2: Endangered Species Permit No. TE026690-0 for Colorado pikeminnow (*Ptychocheilus lucius*) and razorback sucker (*Xyrauchen texanus*). Expired 3/14/06.

USFWS - Region 6: Endangered/Threatened Species Permit No. TE-045235-1 for Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), humpback chub (*Gila cypha*), and bonytail chub (*Gila elegans*). Expired 12/31/03.

USFWS - Region 6: Endangered/Threatened Species Permit No. PRT-704930 (SP00-23-00) for Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), humpback chub (*Gila cypha*), and bonytail chub (*Gila elegans*). Expired 3/31/01.

USFWS - Region 1: Subpermit No. USEPA. Subpermit to Take the Oregon Chub (*Oregonichthys crameri*), Lost River Sucker (*Deltistes luxatus*), Shortnose Sucker (*Chasmistes brevirostris*), Warner Sucker (*Catostomus warnerensis*), and Lahontan Cutthroat Trout (*Salmo clarki henshawi*). Expired 9/30/98.

NMFS - NW Region permit for Scientific Purposes under Section 10 of the Endangered Species Act. Permit 1156. Species included: Upper Columbia spring chinook salmon *(Oncorhynchus tshawytscha)*,Upper Columbia River steelhead (*Oncorhynchus mykiss)*, Lower Columbia River chinook salmon *(O. tshawytscha),* Snake River steelhead (*O. mykiss)*, Middle Columbia River steelhead (*O. mykiss)*, Lower Columbia River steelhead (*O. mykiss)*, Puget Sound chinook salmon *(O. tschawytscha),* Upper Willamette River steelhead *(O. mykiss),* Upper Willamette River chinook salmon *(O. tshawytscha),* Snake River spring/summer chinook salmon (*O. tshawytscha)*, Snake River fall chinook salmon (*O. tshawytscha),* Oregon Coast coho salmon (*Oncorhynchus kisutch*), and Southern Oregon/Northern California Coasts coho salmon (*O. kisutch*). Expired 12/31/06.

Consultation on Environmental Monitoring and Assessment Program in Rogue, Winchuk, Umpqua, Grande Ronde, and Imnaha Basin Streams, U.S. Environmental Protection Agency (9 July 1997).

State of Oregon Scientific Taking Permit Nos. OR2007-3519, 00-112, 00-143, 00-150, 00-118, 02-439M2, OR2003-709
State of Washington Scientific Collection Permit Nos. 06-459A, 00-272a, 02-157a, 03-189a
State of Idaho Scientific Collectors Permit No. F-26-84.
State of Montana Scientific Collectors Permit No. SCP-17-00.
State of Utah Certificate of Registration No. 1COLL4742.
State of North Dakota Scientific Collection Permit No.s 000102044788 and 000102044789.
State of South Dakota Scientific Collection Permit (License) No's. 52, 38, 13.
State of Arizona Scientific Collecting Permit No's. 551518, 622977, 699001, 747696
State of Nevada Scientific Collection Permit No.S 20051, S 22149
State of California Collection Permit No. 006040
State of Colorado Scientific Collection License No. 01-AQ905.
State of Wyoming Chapter 33 Permit No. 510
Olympic National Park (WA) - Permit number OLYM-2003-SCI-0006
Redwood National Park (CA) - Permit number REDW-2003-SCI-0016
California State Parks permit number 03-635-008.
Navajo Nation Fish and Wildlife Permit No. 000804-086.
Flathead Reservation (MT) - No permit number was given.
Warm Springs (OR) - No permit number given.
Nez Perce (ID) - No permit number given.
San Carlos Apache (AZ) - No permit number given.

2. For the above federal permits, list all mortality events of listed species which have occurred in the last five years:

1997 (Oregon):
Snake River chinook salmon ESU - *Oncorhynchus tshawytscha* (Wallowa River, Grande Ronde Basin) one mortality as a result of electrofishing and temperature.

No additional mortalities were recorded for ESU's delineated at that time. There were, however, additional mortalities for non-listed salmonids: *Oncorhynchus mykiss* 19 mortalities as a result of electrofishing and temperature; *Oncorhynchus tshawytscha* 14 mortalities as a result of electrofishing and temperature. There were no coho salmon (*Oncorhynchus kisutch)* mortalities.

We list 34 salmonid mortalities; this compares to 703 salmonids collected in the 21 rivers, for a salmonid mortality rate of 4.8% (which is comparable to the overall fish mortality rate of 4.7%).

1998 (Oregon):
No listed species were taken, thus no mortalities for ESU's delineated at that time. There were, however, additional mortalities for non-listed salmonids: *Oncorhynchus clarki* 8 mortalities (5.8% of the catch in 1998); *Oncorhynchus mykiss* 40 mortalities (7.6% of the catch) in 1998; and *Oncorhynchus tshawytscha* 17 mortalities (16.6% of the catch) in 1998. There were no coho salmon (*Oncorhynchus kisutch)* mortalities.

For 1998, the overall fish mortality rate was 8.6%. Salmonid mortality rate was 9.8% for the 29 rivers sampled; it was highest in the first salmonid river sampled while the crew was still learning how to adjust the pulsator.

1999: No sampling

2000 (WA, OR, ID, MT, UT, ND, SD, CA, WY):
Puget Sound Chinook Salmon *(Oncorhynchus tshawytscha)* ESU: 2 smolts and 1 juvenile were incidentally killed on the Nooksak River, Washington. Causes: possibly direct contact with electrofisher anode, and/or combined effects of the exhaustion resulting from electrofishing and handling coupled with the physiological stresses of smoltification.

Upper Willamette River Chinook Salmon *(Oncorhynchus tshawytscha)* ESU: 5 smolts were incidentally killed on the Willamette River, Oregon. Causes: possibly direct contact with electrofisher anode, and/or combined effects of the exhaustion resulting from electrofishing and handling coupled with the physiological stresses of smoltification.

We encountered several other federally-listed species with no mortalities:
Bull trout (*Salvelinus confluentus*) in Idaho and Washington,
Non-listed coastal cutthroat trout (*Oncorhynchus clarki clarki*) in Washington,
Colorado pikeminnow (*Ptychocheilus lucius*) in Utah
Humpback chub (*Gila cypha*) in Utah.

2001 (WA, OR, ID, MT, UT, ND, SD, CA, WY):
Upper Columbia Spring-Run Chinook Salmon *(Oncorhynchus tshawytscha)* ESU: 39 smolts were

captured and handled on the Wenatchee R., Washington - 35 were released alive and unharmed, 4 were incidentally killed.

Upper Willamette River Chinook Salmon *(Oncorhynchus tshawytscha)* ESU: On the Willamette, M. Fk. Willamette, and Calapooia Rivers a total of 1 adult was observed (not captured or handled) and unharmed to our knowledge; 21 smolts were captured and handled - 17 were released alive and unharmed, 4 were incidentally killed.(1 vouchered, 3 returned to river); and 45 smolt/immatures were captured and handled - 33 were released alive and unharmed, 12 were incidentally killed and returned to the river.

We encountered two other federally-listed species with no mortalities:
Oregon chub (*Oregonichthys crameri*) in Oregon
Colorado pikeminnow (*Ptychocheilus lucius*) in Arizona and Utah

2002 (WA, OR, ID, MT, UT, ND, SD, CA, WY):
Upper Willamette River Chinook Salmon *(Oncorhynchus tshawytscha)* ESU: A total of 41 Upper Willamette River chinook salmon were taken from two sites in the Willamette River in June 2002. These fish were all captured via a raft electrofisher and either measured and released, or retained as voucher specimens only in the event of incidental mortality. We captured and handled 5 chinook juveniles while training field crews on the Willamette R., There was one incidental mortality which was returned to the water and was not retained as a voucher specimen; the remaining four fish were released unharmed. We captured an additional 36 juvenile chinook at a second location on the Willamette River in late June. Of these 36 fish, there was one incidental mortality which was retained as a voucher specimen and the remaining 35 fish were released unharmed. We also observed 10 adult chinook at this second location; these fish were observed via raft electrofishing but were not captured or handled.

We encountered several other federally-listed species with no mortalities:
Upper Columbia River Spring-Run Chinook Salmon *(Oncorhynchus tshawytscha)* in Washington
Lower Columbia River Chinook Salmon *(Oncorhynchus tshawytscha)*in Oregon
Lower Columbia River Steelhead *(Oncorhynchus mykiss)* in Oregon
Southern Oregon/Northern California Coasts Coho (*Oncorhynchus kisutch)* in Oregon
Colorado pikeminnow (*Ptychocheilus lucius*) in Utah
Bonytail chub *(Gila elegans)* in Utah
Humpback chub (*Gila cypha*) in Utah
Bull trout (*Salvelinus confluentus*) in Montana

2003 (WA, OR, ID, AZ, CO, MT, UT, ND, SD, CA, WY):

No listed fish were incidentally killed as a result of electrofishing.
We encountered the following federally-listed species with no mortalities:

Upper Columbia River Spring-Run Chinook Salmon *(Oncorhynchus tshawytscha)* in Washington
Bull trout (*Salvelinus confluentus*) in Washington
Upper Willamette River Chinook Salmon *(Oncorhynchus tshawytscha)* in Oregon
Lost River sucker *(Deltistes luxatus)* in Oregon
Razorback sucker *(Xyrauchen texanus)* in Arizona

2004—2005. No sampling.

2006 (WA, OR)
Upper Willamette River Chinook Salmon *(Oncorhynchus tshawytscha)* ESU: A total of 73 Upper Willamette River Chinook salmon were taken from 20 sites in the Willamette River June-August. These fish were all captured via a raft electrofisher and either measured and released, or retained as voucher specimens only in the event of incidental mortality. There were 6 incidental mortalities; all other Chinook were were released unharmed. A total of 27 rainbow trout (Onchorhynchus mykiss) were taken from 20 sites in the Willamette River June-August. There was 1 incidental mortality; all other trout were were released unharmed.

Upper Columbia River Chinook Salmon *(Oncorhynchus tshawytscha)*: A total of 5 Chinook were taken; all were released unharmed.

Upper Columbia River Steelhead/Rainbow *(Oncorhynchus mykiss)*: One rainbow was taken; it was released unharmed.

We took 47 rainbow trout on the Malheur River, with 1 mortality.

2007 (WA, OR)
Lower Columbia River Chinook Salmon *(Oncorhynchus tshawytscha)*: A total of 5 Chinook were taken from the Chehalis River; all were released unharmed.

We took 203 rainbow trout from the Sprague River, with 9 mortalities.

Measures taken to diminish or eliminate such mortalities, and the effectiveness of those measures: To minimize electrofishing injury, we use a low pulse rate (30 pulses/s), a narrow pulse width (< 6 msec), low peak voltage (500 V), and a soft mesh dip net. These settings are much less damaging to large fish. When we kill a juvenile salmonid and no adults are being observed, we increase the pulse rate (which decreases damage to small fish, but increases the threat to larger fish). If large and small salmonids are present and the small ones are being killed, we shorten the holding time in the live well. We continuously exchange and aerate the water in the livewell. We have also increased the length of the training period and retained the same trained crew to reduce mortalities at the first site sampled. (See section G for more detailed information.)

References
Cao, Y., D.P. Larsen, and R.M. Hughes. 2001. Evaluating sampling sufficiency in fish assemblage surveys—a similarity-based approach. *Canadian Journal of Fisheries and Aquatic Sciences* 58:1782-1793.

Cao, Y., D.P. Larsen, R.M. Hughes, P.L. Angermeier, and T.M. Patton. 2002. Sample size affects multivariate comparisons of stream communities. *Journal of the North American Benthological Society* 21:701-714.

Curry, R.A.., R.M. Hughes, M. McMaster, and D. Zafft. In Press. Coldwater fish in rivers. In S. Bonar, W. Hubert, and D. Willis (eds.). *Standard Methods for Sampling North American*

Freshwater Fishes. American Fisheries Society, Bethesda, MD.

Hubbs, C., J.G. Nickum, and J.R. Hunter. 1998. *Guidelines for Use of Fishes in Field Research*. American Society of Ichthyologists and Herpetologists, American Fisheries Society & American Institute of Fisheries Research Biologists, Bethesda, MD.

Hughes, R.M. 1981. The plains killifish, *Fundulus zebrinus* (Cyprinodontidae), in the Colorado River basin of western North America. *Southwestern Naturalist* 36:321-324.

Hughes, R.M. 1999. Sampling issues related to electrofishing. Pages 35-40 in S.M. Allen-Gil (ed.) *New Perspectives in Electrofishing.* EPA/600/R-99/108. USEPA. Corvallis, OR.

Hughes, R.M., and J.R. Gammon. 1987. Longitudinal changes in fish assemblages and water quality in the Willamette River, Oregon. *Transactions of the American Fisheries Society* 116:196-209.

Hughes, R.M., and A.T. Herlihy. 2007. Electrofishing distance needed to estimate consistent IBI scores in raftable Oregon rivers. *Transactions of the American Fisheries Society* 136:135-141.

Hughes, R.M., and F.H. McCormick. In Press. Aquatic vertebrates. Pages xxx-xxx in D.V. Peck, D. K. Averill, A. T. Herlihy, B. H. Hill, R. M. Hughes, P. R. Kaufmann, D. J. Klemm, J. M. Lazorchak, F. H. McCormick, S. A. Peterson, P. L. Ringold, M. R. Cappaert, T. Magee, and P. A. Monaco (eds.). *Environmental Monitoring and Assessment Program: Surface Waters Western Pilot Study—Field Operations Manual for Nonwadeable Streams and Rivers*. USEPA, Washington, DC.

Hughes, R.M., P.R. Kaufmann, A.T. Herlihy, T.M. Kincaid, L. Reynolds, and D.P. Larsen. 1998. A process for developing and evaluating indices of fish assemblage integrity. *Canadian Journal of Fisheries and Aquatic Sciences* 55:1618-1631.

Hughes, R.M., P.R. Kaufmann, A.T. Herlihy, S.S. Intelmann, S.C. Corbett, M.C. Arbogast, and R.C. Hjort. 2002. Electrofishing distance needed to estimate fish species richness in raftable Oregon rivers. *North American Journal of Fisheries Management* 22:1229-1240.

LaVigne, H.R., R.M. Hughes, and A.T. Herlihy. In Press. Bioassessments to detect changes in Pacific Northwest river fish assemblages: a Malheur River case study. *Northwest Science*.

LaVigne, H.R., R.M. Hughes, R.C. Wildman, S.V. Gregory, and A.T. Herlihy. 2008. Summer distribution and diversity of non-native fishes in the main-stem Willamette River, Oregon, 1944-2006. *Northwest Science* 82:83-93.

Lomnicky, G.A., T.R. Whittier, R.M. Hughes, and D.V. Peck. 2007. Distribution of nonnative aquatic vertebrates in western U.S. streams and rivers. *North American Journal of Fisheries Management* 27:1082-1093.

McCormick, F.H. and R.M. Hughes. 2006. Aquatic vertebrates. Pages 225-250 in Peck, D.V., A.T. Herlihy, B.H. Hill, R.M. Hughes, P.R. Kaufmann, D.J. Klemm, J. M. Lazorchak, F. H.

McCormick, S.A. Peterson, P.L. Ringold, T. Magee, and M.R. Cappaert, eds., *Environmental Monitoring and Assessment Program-Surface Waters: Western Pilot Study Field Operations Manual for Wadeable Streams*. EPA/620/R-06/003. USEPA. Washington, DC.

Meador, M.R., T.R. Whittier, R.M. Goldstein, R.M. Hughes, and D.V. Peck. 2008. Evaluation of an index of biotic integrity approach used to assess biological condition in western U.S. streams and rivers at varying scales. *Transactions of the American Fisheries Society* 137:13-22.

Mebane, C.A., T.R. Maret, and R.M. Hughes. 2003. An index of biological integrity (IBI) for Pacific Northwest rivers. *Transactions of the American Fisheries Society* 132:239-261.

Peterson, S.A., A.T. Herlihy, R.M. Hughes, and J. Van Sickle. 2007. Mercury concentration in fish from streams and rivers throughout the western United States. *Environmental Science and Technology* 41:58-65.

Plafkin, J.L., M.T. Barbour, K.D. Porter, S.K. Gross, and R.M. Hughes. 1989. *Rapid BioassessmentProtocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish*. EPA/444/4-89/001. USEPA, Washington, DC.

Reynolds, L., A.T. Herlihy, P.R. Kaufmann, S.V. Gregory, and R.M. Hughes. 2003. Electrofishing effort requirements for Western Oregon streams. *North American Journal of Fisheries Management* 23(2):450-461.

Rinne, J.N., R.M. Hughes, and B. Calamusso, editors. 2005. *Historical Changes in Large River Fish Assemblages of the Americas*. American Fisheries Society Symposium 45, Bethesda, MD.

Spence, B.C., G.A. Lomnicky, R.M. Hughes, and R.P. Novitzki. 1996. *An Ecosystem Approach to Salmonid Conservation*. TR-4501-96-6057. National Marine Fisheries Service. Portland, OR.

Stoddard, J.and 13 coauthors. 2005. *An Ecological Assessment of Western Streams and Rivers.* EPA 620/R-05/005. U. S. Environmental Protection Agency, Washington, DC.

Whittier, T.R., and D.V. Peck. In Press. Arial extent of fish assemblage inferences in the western USA. *North American Journal of Fisheries Management*.

Whittier, T.R., R.M. Hughes, J.L. Stoddard, G.A. Lomnicky, D.V. Peck, and A.T. Herlihy. 2007. A structured approach to developing indices of biotic integrity: three examples from western USA streams and rivers. *Transactions of the American Fisheries Society* 136:718-735.

XII & XIII. Certification:

I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (]6 U.S.C. 1531 et seq.) and regulations promulgated thereunder, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or to penalties under the Endangered Species Act of 1973.

Name: Robert M. Hughes

Title: Senior Research Professor

Signature: Robert M. Hughes Date: 6 June 2008

Anticipated Annual Take

ESU/Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
UCR Chinook	Juvenile	Naturally Produced	Raft Electrofishing	125	6	Okanogan River, Washington	June-September
UCR Chinook	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	Okanogan River, Washington	June-September
UCR Chinook	Adult	Naturally Produced	Raft Electrofishing	50	0	Okanogan River, Washington	June-September
UCR Chinook	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Okanogan River, Washington	June-September
UCR Steelhead	Juvenile	Naturally Produced	Raft Electrofishing	125	6	Okanogan River, Washington	June-September
UCR Steelhead	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	Okanogan River, Washington	June-September
UCR Steelhead	Adult	Naturally Produced	Raft Electrofishing	50	0	Okanogan River, Washington	June-September
UCR Steelhead	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Okanogan River, Washington	June-September

ESU/Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
LCR Chinook	Juvenile	Naturally Produced	Raft Electrofishing	125	6	Cowlitz River, Washington	June-September
LCR Chinook	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	Cowlitz River, Washington	June-September
LCR Chinook	Adult	Naturally Produced	Raft Electrofishing	50	0	Cowlitz River, Washington	June-September
LCR Chinook	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Cowlitz River, Washington	June-September
LCR Steelhead	Juvenile	Naturally Produced	Raft Electrofishing	125	6	Cowlitz River, Washington	June-September
LCR Steelhead	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	Cowlitz River, Washington	June-September
LCR Steelhead	Adult	Naturally Produced	Raft Electrofishing	50	0	Cowlitz River, Washington	June-September
LCR Steelhead	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Cowlitz River, Washington	June-September
UWR Steelhead	Juvenile	Naturally Produced	Raft Electrofishing	125	6	Willamette River, Oregon	June-September

ESU/Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
UWR Steelhead	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	Willamette River, Oregon	June-September
UWR Steelhead	Adult	Naturally Produced	Raft Electrofishing	50	0	Willamette River, Oregon	June-September
UWR Steelhead	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Willamette River, Oregon	June-September
OC Coho	Juvenile	Naturally Produced	Raft Electrofishing	250	12	Umpqua River, Oregon	June-September
OC Coho	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	250	12	Umpqua River, Oregon	June-September
OC Coho	Adult	Naturally Produced	Raft Electrofishing	50	0	Umpqua River, Oregon	June-September
OC Coho	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Umpqua River, Oregon	June-September
Lower Columbia Coho	Juvenile	Naturally Produced	Raft Electrofishing	250	12	Sandy River, Oregon	June-September
Lower Columbia Coho	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	250	12	Sandy River, Oregon	June-September

ESU/Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Lower Columbia Coho	Adult	Naturally Produced	Raft Electrofishing	50	0	Sandy River, Oregon	June-September
Lower Columbia Coho	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Sandy River, Oregon	June-September
Puget Chinook	Juvenile	Naturally Produced	Raft Electrofishing	125	6	Skagit River, Washington	June-September
Puget Chinook	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	Skagit River, Washington	June-September
Puget Chinook	Adult	Naturally Produced	Raft Electrofishing	50	0	Skagit River, Washington	June-September
Puget Chinook	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Skagit River, Washington	June-September
Puget Steelhead	Juvenile	Naturally Produced	Raft Electrofishing	125	6	Skagit River, Washington	June-September
Puget Steelhead	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	Skagit River, Washington	June-September
Puget Steelhead	Adult	Naturally Produced	Raft Electrofishing	50	0	Skagit River, Washington	June-September

ESU/Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Puget Steelhead	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Skagit River, Washington	June-September
UWR Chinook	Juvenile	Naturally Produced	Raft Electrofishing	125	6	Willamette River, Oregon	June-September
UWR Chinook	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	Willamette River, Oregon	June-September
UWR Chinook	Adult	Naturally Produced	Raft Electrofishing	50	0	Willamette River, Oregon	June-September
UWR Chinook	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Willamette River, Oregon	June-September
Snake Spring Chinook	Juvenile	Naturally Produced	Raft Electrofishing	125	6	Grand Ronde River, Oregon	June-September
Snake Spring Chinook	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	Grand Ronde River, Oregon	June-September
Snake Spring Chinook	Adult	Naturally Produced	Raft Electrofishing	50	0	Grand Ronde River, Oregon	June-September
Snake Spring Chinook	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Grand Ronde River, Oregon	June-September

ESU/Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Snake Steelhead	Juvenile	Naturally Produced	Raft Electrofishing	125	6	Grand Ronde River, Oregon	June-September
Snake Steelhead	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	Grand Ronde River, Oregon	June-September
Snake Steelhead	Adult	Naturally Produced	Raft Electrofishing	50	0	Grand Ronde River, Oregon	June-September
Snake Steelhead	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Grand Ronde River, Oregon	June-September
Snake Fall Chinook	Juvenile	Naturally Produced	Raft Electrofishing	125	6	Grand Ronde River, Oregon	June-September
Snake Fall Chinook	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	Grand Ronde River, Oregon	June-September
Snake Fall Chinook	Adult	Naturally Produced	Raft Electrofishing	50	0	Grand Ronde River, Oregon	June-September
Snake Fall Chinook	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Grand Ronde River, Oregon	June-September
M C Steelhead	Juvenile	Naturally Produced	Raft Electrofishing	125	6	John Day River, Oregon	June-September

ESU/Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
M C Steelhead	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	125	6	John Day River, Oregon	June-September
M C Steelhead	Adult	Naturally Produced	Raft Electrofishing	50	0	John Day River, Oregon	June-September
M C Steelhead	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	John Day River, Oregon	June-September
Columbia Chum	Juvenile	Naturally Produced	Raft Electrofishing	250	12	Sandy River, Oregon	June-September
Columbia Chum	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	250	12	Sandy River, Oregon	June-September
Columbia Chum	Adult	Naturally Produced	Raft Electrofishing	50	0	Sandy River, Oregon	June-September
Columbia Chum	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Sandy River, Oregon	June-September
Columbia Chum	Juvenile	Naturally Produced	Raft Electrofishing	250	12	Cowlitz River, Washington	June-September
Columbia Chum	Juvenile	Listed Hatchery Adipose Clipped	Raft Electrofishing	250	12	Cowlitz River, Washington	June-September

ESU/Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Columbia Chum	Adult	Naturally Produced	Raft Electrofishing	50	0	Cowlitz River, Washington	June-September
Columbia Chum	Adult	Listed Hatchery Adipose Clipped	Raft Electrofishing	50	0	Cowlitz River, Washington	June-September